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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/569,006	02/21/2006	Katsumi Morikawa	7620-X06-005	1756
27317 7590 02/09/2007 FLEIT KAIN GIBBONS GUTMAN BONGINI & BIANCO 21355 EAST DIXIE HIGHWAY SUITE 115 MIAMI, FL 33180			EXAMINER KERNS, KEVIN P	
			ART UNIT 1725	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		02/09/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/569,006	<b>Applicant(s)</b> MORIKAWA ET AL.	
	<b>Examiner</b> Kevin P. Kerns	<b>Art Unit</b> 1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 21 February 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 14-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 14-26 is/are rejected.
- 7) ☒ Claim(s) 14,23 and 24 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 February 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>2/21/06</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Specification*

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

In this instance, replace the legal term "means" in the 3rd line, and replace "Disclosed is a" (phrase that can be implied) with "A" in the 1st line.

2. The disclosure is objected to because of the following informalities: on page 4, 7th line from the end of the page, replace "degree" with "degrees" after "120".  
Appropriate correction is required.

### *Claim Objections*

3. Claims 14, 23, and 24 are objected to because of the following informalities: in claim 14, 1st line, insert "said nozzle" after "steel,". In claim 14, 4th line, insert "the" before "wall" to obtain proper antecedent basis. In claim 23, 1st line, replace "claim 1" with "claim 14". In claim 24, 3rd line, replace "gas inert relative to steel is" with "gas, inert relative to steel, is" for clarity. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 25 and 26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With regard to independent claim 25, this method claim is generally written in a narrative format, rendering the claim indefinite. This method claim should be written to distinctly set forth positive, active process steps.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 14-20, 22, 23, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 8-39214 in view of JP 2002-239690.

JP 8-39214 discloses an immersion nozzle for use in a method of continuous casting of clean molten steel, in which the nozzle includes an inner hole 3 having a wall surface that comes in contact with the molten steel, with the wall surface being formed (either entirely or at least in part) of tubular-shaped refractory layers (2,6), such that the refractory layer 2 is carbonaceous (graphite-containing) and the refractory layer 6 is comprised of 5-87 wt% CaO, 10-92 wt% MgO, and 2-15 wt% SiO<sub>2</sub> (inclusive of <5 wt% Si) over a wide range of various controlled weight ratios (inclusive of CaO + MgO being 65 wt% or more, and containing at least a trace amount of carbonaceous material(s) near the contact region of carbonaceous refractory layer 2), as well as controlled low porosities and layer thicknesses based upon the weight ratios, as one of ordinary skill in the art would have recognized based upon the temperatures reached in the continuous casting apparatus (abstract; paragraphs [0012]-[0040] of Japanese text; and Figures 1-3). JP 8-39214 does not disclose the use of a swirl vane provided in the inner hole of the nozzle.

However, JP 2002-239690 discloses an immersion nozzle for use in a continuous casting method of cast slabs, in which the immersion nozzle includes a spiral-shaped swirling blade/vane (at a 60-180 degree twist angle) provided in a tier

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portion (adjacent the reduced diameter region) of the inner hole of the nozzle, such that the swirling blade/vane is advantageous for improving the cast slab surface and for reducing porosity defects at the center part of the cast slab (abstract; and Figures 1, 3, 5, and 14).

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the immersion nozzle for use in a method of continuous casting of molten steel, as disclosed by JP 8-39214, by using a swirl vane provided in the inner hole of the nozzle, as taught by JP 2002-239690, in order to improve the cast slab surface and to reduce porosity defects at the center part of the cast slab (JP 2002-239690; abstract).

9. Claims 21, 24, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 8-39214 in view of JP 2002-239690, as applied to claims 14 and 25 above, and further in view of JP 10-263765.

JP 8-39214 (in view of JP 2002-239690) disclose and/or suggest the elements of independent claims 14 and 25. Neither JP 8-39214 nor JP 2002-239690 disclosed the use of an inert gas injection port and supply of inert gas provided above the swirl vane within the immersion nozzle.

However, JP 10-263765 discloses a method for controlling molten metal flow by an immersion nozzle in a continuous casting apparatus, in which the immersion nozzle 5 includes a gas injecting hole 3 and a plurality of slits 2 for introducing gas in the upper portion of the nozzle 5 (which would also be located above the swirl vane of JP 2002-

239690), in which the inert gas injection port and supply of inert gas provided above the swirl vane within the immersion nozzle are advantageous for uniformizing the flow speed of molten metal from the nozzle while developing stirring flow through the nozzle, which would result in restraining development of defects/inclusions into the molten metal (abstract; and Figures 1-6).

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the immersion nozzle for use in a method of continuous casting of molten steel, as disclosed by JP 8-39214, by using a swirl vane provided in the inner hole of the nozzle, as taught by JP 2002-239690, in order to improve the cast slab surface and to reduce porosity defects at the center part of the cast slab, and by further providing an inert gas injection port and supply of inert gas provided above the swirl vane within the immersion nozzle, as disclosed by JP 10-263765, in order to uniformize the flow speed of molten metal from the nozzle while developing stirring flow through the nozzle, which would result in restraining development of defects/inclusions into the molten metal (JP 10-263765; abstract).

### ***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The Ando et al., Marukawa et al., Ogata, JP 61-256961, and JP 1-289549 references are also cited in PTO-892.

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11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kevin P. Kerns whose telephone number is (571) 272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kevin P. Kerns *Kevin Kerns 2/6/07*  
Primary Examiner  
Art Unit 1725

KPK

kpk

February 6, 2007